

2926

DRINKING WATER SURVEILLANCE PROGRAM

**PEMBROKE
WATER TREATMENT
PLANT**

ANNUAL REPORT 1992

ISSN 1195-1230

**PEMBROKE WATER TREATMENT PLANT
DRINKING WATER SURVEILLANCE PROGRAM
ANNUAL REPORT 1992**

APRIL 1994



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PIBS 2926

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

PEMBROKE WATER TREATMENT PLANT ANNUAL REPORT 1992

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1992, 109 supplies were being monitored.

The Pembroke water treatment plant is a conventional treatment plant which treats water from the Ottawa River. The process consists of alkalinity adjustment, coagulation, flocculation, sedimentation, filtration, pH adjustment and disinfection. This plant has a rated capacity of $25.5 \times 1000 \text{ m}^3/\text{day}$. The Pembroke water treatment plant serves a population of approximately 20,500.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

Table A is a summary of all results by group.

The health related guideline for turbidity was exceeded in one treated water sample. The District Officer was notified.

No other known health related guidelines were exceeded.

The Pembroke water treatment plant, for the sample year 1992, produced good quality water and this was maintained in the distribution system.

TABLE A
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE		RAW		TREATED		JOE ST		ALFRED ST	
	TESTS	POSITIVE	TESTS	POSITIVE	TESTS	POSITIVE	TESTS	POSITIVE	TESTS	POSITIVE
BACTERIOLOGICAL	30	21	70	10	2	20	6	1	16	3
CHEMISTRY (FIELD)	33	33	100	66	64	96	54	52	96	17
CHEMISTRY (LABORATORY)	242	215	88	253	192	75	220	191	86	175
METALS	264	77	29	264	66	25	253	93	36	69
CHLOROAROMATICS	153	0	0	153	0	0	83	0	0	0
CHLOROPHENOLS	66	0	0	66	2	3	.	.	.	.
PESTICIDES AND PCB	380	0	0	379	0	0	131	0	0	0
PHENOLICS	11	1	9	11	0	0	.	.	.	.
POLYAROMATIC HYDROCARBONS	.	.	.	.	.	.	17	0	0	.
SPECIFIC PESTICIDES	106	0	0	106	0	0	.	.	.	.
VOLATILES	341	3	0	310	30	9	186	18	9	15
RADIONUCLIDES	14	3	21	14	3	21	.	.	.	.
TOTAL	1,640	353	1,632		359	950		355	794	279

DRINKING WATER SURVEILLANCE PROGRAM

PEMBROKE WATER TREATMENT PLANT ANNUAL REPORT 1992

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1992, 109 supplies were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Pembroke water treatment plant in March of 1992. This is the first published DWSP report.

PLANT DESCRIPTION

The Pembroke water treatment plant is a conventional treatment plant which treats water from the Ottawa River. The process consists of alkalinity adjustment, coagulation, flocculation, sedimentation, filtration, pH adjustment and disinfection. This plant has a rated capacity of $25.5 \times 1000 \text{ m}^3/\text{day}$. The Pembroke water treatment plant serves a population of approximately 20,500.

The sample day flows ranged from $6.5 \times 1000 \text{ m}^3/\text{day}$ to $11.5 \times 1000 \text{ m}^3/\text{day}$.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Stringent DWSP sampling protocols were followed to ensure that all samples were collected in a uniform manner (see Appendix B).

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water

between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

To obtain a representative raw water sample, free from any added chemicals, at plants which used chlorine for zebra mussel control, the operator was required to turn off the chlorine feed to the mouth of the intake and allow enough time for the chlorinated water to clear from the intake works.

Plant operating personnel routinely analyzed parameters for process control (Table 2).

At all distribution system locations, two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples, therefore, were laboratory chemistry and metals. The free flow sample represented fresh water from the distribution system main, since the sample tap was flushed for five minutes prior to sampling.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour. Extra sampling for chlorophenols was conducted at water treatment plants down stream of pulp and paper mills.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between the raw and treated water sampling, flow rate, and treatment chemicals dosages.

Table 4 is a summary of all results by parameter and by water type. If a parameter was not detected, the total number of negative

sample results is given. In contrast, if a parameter was detected at any location, the detailed results for all samples are provided.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment and Energy laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 4 and 5. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

The guidelines are evaluated on the results from the free flowing samples. Standing samples in the distribution system can show elevated concentrations in certain metals if the water is corrosive or if the standing time is excessive. Flushing the tap until the water achieves the coolest temperature will ensure that the water used for consumption will contain minimum concentrations of metals.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- THE TREATED AND DISTRIBUTED WATER;
- ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE
GUIDELINE VALUES; AND
- POSITIVE ORGANIC PARAMETERS DETECTED.

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Standard plate count was the only bacteriological analysis conducted on the treated and distributed water.

Standard plate count is a test used to supplement routine analysis for coliform bacteria. The limit for standard plate count (at 35°C

after 48 hours) in the ODWOs is 500 counts/mL (based on a geometric mean of 5 or more samples). DWSP bacteriological analysis of treated and distributed water was limited to standard plate count.

Standard plate count (membrane filtration) exceeded the ODWO Aesthetic Objective of 500 counts/mL in 1 of 17 treated and distributed water samples with a maximum reported value of 560 counts/mL.

INORGANIC & PHYSICAL

CHEMISTRY (FIELD)

Field pH exceeded the ODWO Recommended Operational Guideline of 6.5-8.5 pH units in 3 of 21 treated and distributed water samples with a maximum reported value of 9.5 pH units.

It is desirable that the temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of delivered water may increase in the distribution system due to the warming effect of soil in late summer and fall and/or as a result of higher temperatures in the source water.

Field temperature exceeded the ODWO Aesthetic Objective of 15°C in 7 of 22 treated and distributed water samples with a maximum reported value of 20.6°C.

Protocol for turbidity states that laboratory and field measurements should be made within 48 hours. This is only achieved consistently when measured in the field; therefore, the field turbidity values are considered more reliable.

Field turbidity exceeded the ODWO Maximum Acceptable Concentration of 1.0 FTU in 1 of 11 treated water samples with a maximum reported value of 1.1 FTU. The District Officer was notified.

CHEMISTRY (LABORATORY)

Alkalinity was below the ODWO Recommended Operational Guideline of 30-500 mg/L in 15 of 22 treated and distributed water samples with a minimum reported value of 16.4 mg/L.

Colour in drinking water may be due to the presence of natural or synthetic substances as well as certain metallic ions. Colour is measured in Hazen units (HZU).

Colour exceeded the ODWO Aesthetic Objective of 5 HZU in 7 of 22 treated and distributed water samples with a maximum reported value of 6.0 HZU.

The ODWOs indicate that a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters provides an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and possess a tendency to form scale deposits and result in excessive soap consumption.

Hardness was below the ODWO Recommended Operational Guideline of 80-100 mg/L in all 22 treated and distributed water samples ranging from 27.0 to 46.7 mg/L.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO Maximum Acceptable Concentration for turbidity is 1.0 Formazin Turbidity Unit (FTU) and applies to the water leaving the treatment facility.

Turbidity exceeded the ODWO Maximum Acceptable Concentration of 1.0 FTU in 2 of 11 treated water samples with a maximum reported value of 1.52 FTU. One result was confirmed by the corresponding and more reliable field turbidity result. The District Officer was notified.

METALS

At present, there is no evidence that aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of aluminum in treated water is important to measure the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as aluminum in the water leaving the plant to avoid problems in the distribution system.

Aluminum exceeded the ODWO Recommended Operational Guideline of 100 ug/L in 7 of 22 treated and distributed water samples with a maximum reported value of 210.0 ug/L.

Manganese, in high concentrations, can contribute to laundry staining and undesirable tastes.

Manganese exceeded the ODWO Aesthetic Objective of 50.0 ug/L in 1 of 22 treated and distributed water samples with a maximum reported value of 83.0 ug/L.

ORGANIC

CHLOROAROMATICS

The results of the chloroaromatic scan showed that none were detected above trace levels.

CHLOROPHENOLS

2,4,6-trichlorophenol was found at positive levels in 2 of the 11 treated water samples analyzed. The maximum observed level was 250.0 ng/L. This was below the ODWO Maximum Acceptable Concentration of 5,000 ng/L. It was also detected at trace levels in 7 of the 11 treated water samples.

This chlorophenol was usually found in the treated water but not in the raw water. This suggests that chlorine, used for disinfection, may react with phenol to form a chlorophenol within the treatment process.

PESTICIDES AND PCB

The results of the pesticide and PCB scan showed that none were detected.

PHENOLICS

The results of the phenolics test showed that none were detected above trace levels.

POLYAROMATIC HYDROCARBONS

The results of the polyaromatic hydrocarbon scan showed that none were detected.

SPECIFIC PESTICIDES

The results of the specific pesticide scan showed that none were detected.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology. Trace levels of styrene are considered to be laboratory artifacts resulting from the sample shipping containers.

Chloroform was detected at trace and low positive levels in all raw water samples. The source may be from upstream pulp and paper mills that discharge into the Ottawa River. This phenomena has been found at other water treatment plants using the same raw water source.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THM results are discussed. Starting in 1991, samples

from the distribution system were quenched with sodium thiosulphate to stop the further production of THMs in the sample bottle. This provided a more representative estimation of the THMs consumed in tap water.

Total trihalomethanes were found at positive levels in all 21 treated and distributed water samples analyzed with a maximum level of 150.2 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

RADIOLOGICAL

RADIONUCLIDES

There are more than 200 radionuclides, some of which occur naturally and others which originate from the activities of society. The radionuclides currently of greater interest from a health view-point are tritium, strontium-90, iodine-131, cesium-137 and radium-226. The gross beta and gross alpha determinations are suitable for preliminary screening except for tritium which must be measured separately. Radionuclides are measured in becquerels per litre (Bq/L). No results were above the available guidelines.

CONCLUSIONS

The health related guideline for turbidity was exceeded in one treated water sample. The District Officer was notified.

No other known health related guidelines were exceeded.

The Pembroke water treatment plant, for the sample year 1992, produced good quality water and this was maintained in the distribution system.

FIGURE 1

PEMBROKE WATER TREATMENT PLANT

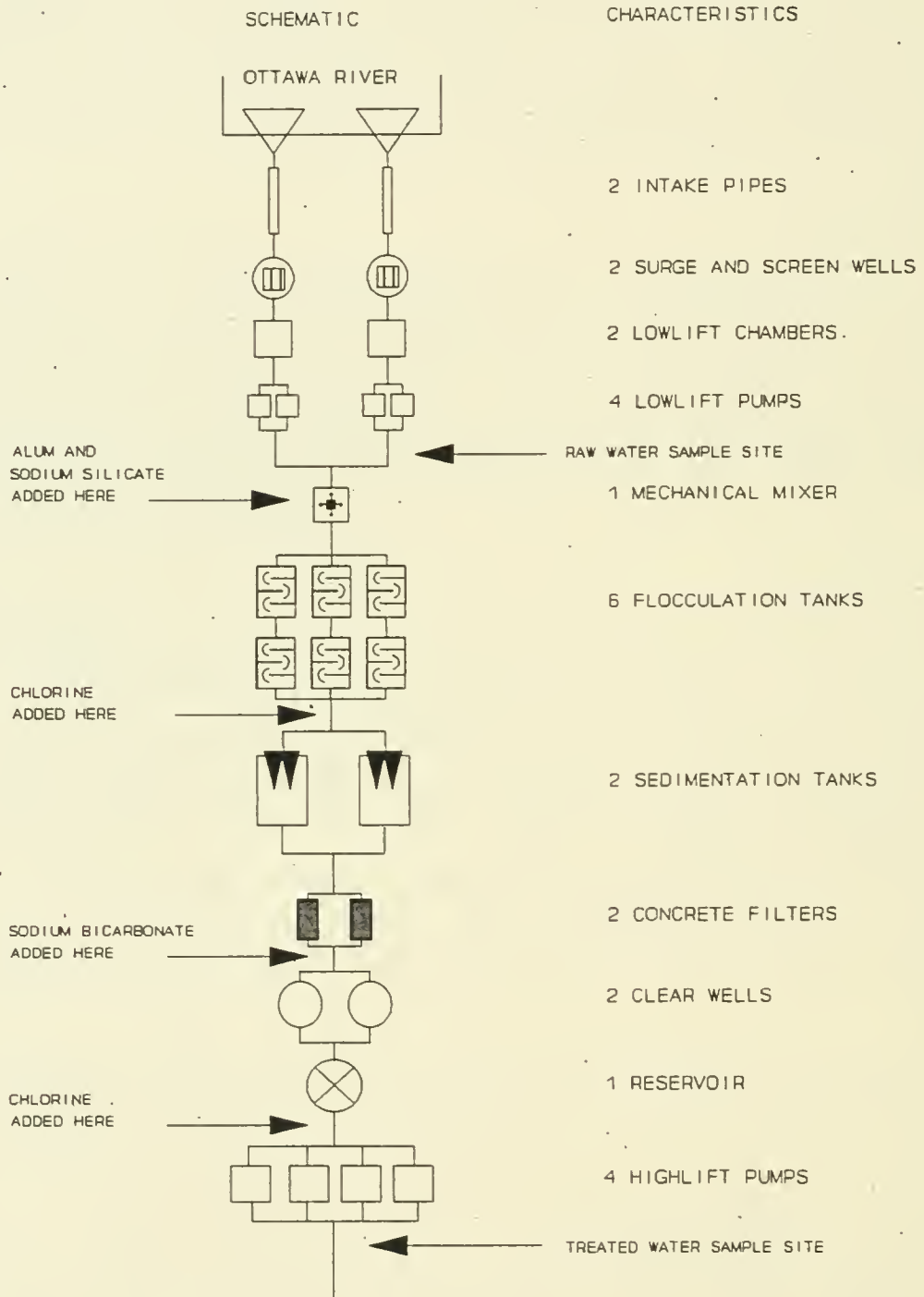


TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

PLANT GENERAL REPORT

PLANT NAME: PEMBROKE WTP
 WORKS #: 220000941
 UTM #: 183338505077850

DISTRICT: OTTAWA
 REGION: SOUTHEAST
 DISTRICT OFFICER: R. DUNN

PLANT SUPERINTENDENT: D. ATKINSON

ADDRESS: 1 RIVERSIDE DR.
 PEMBROKE, ONTARIO
 K8A 5K9
 613-735-0309

MUNICIPALITY: PEMBROKE
 AUTHORITY: MUNICIPAL

PLANT INFORMATION

PLANT VOLUME:	15.941	(X 1000 M3)
DESIGN CAPACITY:	36.185	(X 1000 M3/DAY)
RATED CAPACITY:	25.500	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
-----	-----
PEMBROKE	16,000
TOWNSHIP OF PETAWAWA	4,500

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER -----	LOCATION -----	FREQUENCY -----
ALUMINUM	LAB FILTERED LAB TREATED	DAILY READING DAILY READING
FREE CHLORINE RESIDUAL	LAB FILTERED LAB TREATED	DAILY READING DAILY READING
COMBINED CHLORINE RESIDUAL	LAB FILTERED LAB TREATED	DAILY READING DAILY READING
TOTAL CHLORINE RESIDUAL	LAB FILTERED LAB TREATED	DAILY READING DAILY READING
PH	LAB RAW LAB FILTERED LAB TREATED	DAILY READING DAILY READING DAILY READING
TEMPERATURE	LAB RAW LAB FILTERED LAB TREATED	DAILY READING DAILY READING DAILY READING
COLOUR	LAB RAW LAB FILTERED LAB TREATED	DAILY READING DAILY READING DAILY READING
ALKALINITY	LAB RAW LAB FILTERED LAB TREATED	DAILY READING DAILY READING DAILY READING
HARDNESS	LAB RAW LAB FILTERED LAB TREATED	DAILY READING DAILY READING DAILY READING
IRON	LAB RAW LAB TREATED	WEEKLY READING WEEKLY READING
TURBIDITY	RAW FILTERED TREATED LAB RAW LAB FILTERED LAB TREATED	CONTINUOUS CONTINUOUS CONTINUOUS DAILY READING DAILY READING DAILY READING

TABLE 3
DRINKING WATER SURVEILLANCE PROGRAM PEMBROKE WTP SAMPLE DAY CONDITIONS
AND TREATMENT CHEMICAL DOSAGES FOR 1992

DATE	DELAY * TIME(HRS)	FLOW (1000M3)	PRE CHLORINATION CHLORINE	POST CHLORINATION CHLORINE	COAGULATION AID SODIUM SILICATE	COAGULATION ALUM LIQUID	CORROSION CONTROL SODIUM BICARBONATE
92 FEB 26	37.25	8.556	2.92	.58	2.49	29.60	15.00
92 MAR 10	.00	-	3.38	.56	2.54	30.50	15.00
92 APR 14	.00	8.505	3.05	.51	2.60	31.90	9.80
92 MAY 12	.00	11.526	2.14	.40	2.41	30.00	21.30
92 JUN 09	.00	9.746	2.41	.62	2.39	33.80	20.50
92 JUL 14	.25	6.547	4.12	.58	2.65	26.90	24.30
92 AUG 11	.33	6.887	2.30	.74	2.20	32.10	19.60
92 SEP 15	.00	7.723	2.95	.65	2.38	33.00	18.50
92 OCT 14	.00	7.820	2.62	.89	2.59	34.50	18.60
92 NOV 10	.00	9.473	2.88	.96	3.30	30.30	16.60
92 DEC 08	.20	7.555	1.24	.69	3.35	33.80	17.20

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

KEY TO TABLE 4 and 5

- A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
 - 1+. MAC for Total Trihalomethanes
 2. Interim Maximum Acceptable Concentration (IMAC)
 3. Aesthetic Objective (AO)
 - 3*. AO for Total Xylenes
 4. Recommended Operational Guideline
 5. Health Related Guidance Value
- B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
 4. Aesthetic Objective (AO)
- C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Quality Criteria
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissable Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- I NEW YORK STATE AMBIENT WATER GUIDELINE
- N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurement Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!48	No Data: Sample Age Exceeded 48 Hours
!AR	No Data: No Numeric Results
!AW	No Data: Analysis Withdrawn
!BT	No Data: Sample Broken In Transit
!CS	No Data: Contamination Suspected
!EF	No Data: Laboratory Equipment Failure
!IR	No Data: Insufficient Sample
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedure Error: Sample Discarded
!PR	No Data: Preservative Required
!QU	No Data: Quality Control Unacceptable
!RE	No Data: Received Empty
!RO	No Data: No Numeric Results
!SM	No Data: Sample Missing
!SS	No Data: Sample Improperly Preserved
!U	No Data: Sample Unsuitable For Analysis
!UB	No Data: Bottle Broken
!UN	No Data: Result Unreliable

!UR	No Data: Unpreserved Sample Required
A	Approximate Value
A3C	Approximate, Total Count Exceeded 300 Colonies
A>	Approximate Value, Exceeded Normal Range
APS	Additional Peak, Less Than, Not Priority Pollutant
ARO	Additional Information In Laboratory Report
CRO	Calculated Result Only
NAF	Not All Required Tests Found
RID	Ioncal Calculated on Incomplete Data Set
RMP	P and M-Xylene Not Separated
RRR	Result Obtained by Repeat Analysis
RRV	Rerun Verification
SFA	Sample Filtered: Filtrate Analyzed
SIL	Sample Incorrectly Labelled
SPS	Several Peaks, Small, Not Priority Pollutant
U48	Unreliable: Sample Age Exceeded 48 Hours
UAL	Unreliable: Sample Age Exceeded Limit
UAU	Unreliable: Sample Age Unknown
UCS	Unreliable: Contamination Suspected
WSD	Wrong Sample Description On Bottle

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
BACTERIOLOGICAL					
FECAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 0 (A1)	
1992 FEB	BDL	.	.	.	.
1992 MAR	5	.	.	.	.
1992 APR	5	.	.	.	.
1992 MAY	0	.	.	.	.
1992 JUN	2	.	.	.	.
1992 JUL	4	.	.	.	.
1992 AUG	2	.	.	.	.
1992 SEP	2	.	.	.	.
1992 OCT	1	.	.	.	.
1992 DEC	2	.	.	.	.
STANDRD PLATE CNT MF (CT/ML)					
		DET'N LIMIT = 0		GUIDELINE = 500 (A3)	
1992 FEB	.	2 <=>	0 <=>	.	.
1992 MAR	.	0 <=>	1 <=>	.	.
1992 APR	.	4 <=>	.	1 <=>	.
1992 MAY	.	0 <=>	1 <=>	.	.
1992 JUN	135	.	.	153	.
1992 JUL	.	0 <=>	.	560 A3C	.
1992 AUG	33	.	.	8 <=>	.
1992 SEP	.	4 <=>	1 <=>	.	.
1992 OCT	.	1 <=>	.	11	.
1992 NOV	.	.	24	.	.
1992 DEC	.	2 <=>	2 <=>	.	.
TOTAL COLIFORM MF (CT/100ML)					
		DET'N LIMIT = 0		GUIDELINE = 5/100ML (A1)	
1992 FEB	BDL	.	.	.	.
1992 MAR	24	.	.	.	.
1992 APR	188	.	.	.	.
1992 MAY	44 A3C	.	.	.	.
1992 JUN	36 A3C	.	.	.	.
1992 JUL	40 <=>	.	.	.	.
1992 AUG	BDL	.	.	.	.
1992 SEP	BDL	.	.	.	.
1992 OCT	30 <=>	.	.	.	.
1992 DEC	50 <=>	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM		DIST. SYSTEM		DIST. SYSTEM	
		JOE ST	FREE FLOW	JOE ST	STANDING	ALFRED ST	FREE FLOW
CHEMISTRY (FIELD)							
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = N/A			
1992 FEB	50 <=>	.	.	.	.	.	
1992 MAR	100	.	.	.	.	.	
1992 APR	720	.	.	.	.	.	
1992 MAY	1360 A3C	.	.	.	.	.	
1992 JUN	1720 A3C	.	.	.	.	.	
1992 JUL	24000 >	.	.	.	.	.	
1992 AUG	00000 A3C	.	.	.	.	.	
1992 SEP	9400 A3C	.	.	.	.	.	
1992 OCT	24000 >	.	.	.	.	.	
1992 DEC	400	.	.	.	.	.	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST		DIST. SYSTEM JOE ST		DIST. SYSTEM ALFRED ST		DIST. SYSTEM ALFRED ST	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
CHEMISTRY (FIELD)										
FLD CHLORINE (COMB) (MG/L)			DET'N LIMIT = 0		GUIDELINE = N/A					
1992 FEB	.	.000	.200	.100	.100	.	.	.	.	.
1992 MAR	.	.000	.100	.	.	.100	.	.	.100	.
1992 APR	.	.100	.050	.	.050	.	.	.	.	.
1992 MAY	.	.100	.	.	.	.	.	.	.000	.
1992 JUN	.	.100	.	.	.	.	.	.	.000	.
1992 JUL	.	.200	.	.	.	.	.	.	.000	.
1992 AUG	.	.200	.100	.	.100	.	.	.	.010	.
1992 SEP	.	.100	.050	.	.050	.	.	.	.	.
1992 OCT	.	.050	.200	.	.200	.	.	.	.	.
1992 NOV	.	.200	.	.	.	.	.	.	.	.
1992 DEC	.	.	.	.	.	.	.	.	.	.
FLD CHLORINE FREE (MG/L)			DET'N LIMIT = 0		GUIDELINE = N/A					
1992 FEB	.	.700	.400	.300	.300	.	.	.	.	.
1992 MAR	.	.700	.300	.	.	.200	.	.	.	.
1992 APR	.	.400	.150	.	.150	.	.	.	.	.
1992 MAY	.	.500	.	.	.	.000	.	.	.	.
1992 JUN	.	.500	.	.	.	.000	.	.	.	.
1992 JUL	.	.600	.	.	.	.000	.	.	.	.
1992 AUG	.	.200	.100	.	.100	.	.	.	.	.
1992 SEP	.	.600	.150	.	.150	.	.	.	.	.
1992 OCT	.	.700	.000	.	.000	.	.	.	.	.
1992 NOV	.	.750	.	.	.	.	.	.	.	.
1992 DEC	.	.300	.	.	.	.	.	.	.	.
FLD CHLORINE (TOTAL) (MG/L)			DET'N LIMIT = 0		GUIDELINE = N/A					
1992 FEB	.	.700	.600	.400	.400	.	.	.	.	.
1992 MAR	.	.700	.400	.	.	.300	.	.	.	.
1992 APR	.	.500	.200	.	.200	.	.	.	.	.
1992 MAY	.	.600	.	.	.	.000	.	.	.	.
1992 JUN	.	.600	.	.	.	.000	.	.	.	.
1992 JUL	.	.800	.	.	.	.010	.	.	.	.
1992 AUG	.	.400	.200	.	.200	.	.	.	.	.
1992 SEP	.	.700	.200	.	.	.010	.	.	.	.
1992 OCT	.	.800	.200	.	.200	.	.	.	.	.
1992 NOV	.	.800	.200	.	.200	.	.	.	.	.
1992 DEC	.	.500	.200	.	.200	.	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST	DIST. SYSTEM JOE ST	DIST. SYSTEM JOE ST	DIST. SYSTEM ALFRED ST	DIST. SYSTEM ALFRED ST	DIST. SYSTEM ALFRED ST
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
CHEMISTRY (FIELD)								
FLD PH (OMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)			
1992 FEB	6.900	8.300	7.000	7.100	7.100	7.000	7.000	7.000
1992 MAR	6.800	7.600	7.100	7.100	7.100	7.000	7.000	7.000
1992 APR	7.000	7.600	6.900	6.900	6.900	7.400	7.400	7.400
1992 MAY	6.800	7.400	6.900	6.900	6.900	7.200	7.200	7.200
1992 JUN	6.700	9.500	6.900	6.900	6.900	7.300	7.300	7.300
1992 JUL	6.800	8.000	6.900	6.900	6.900	6.900	6.900	6.900
1992 AUG	7.000	9.200	6.800	6.800	6.800	6.900	6.900	6.900
1992 SEP	7.300	7.800	7.200	7.200	7.200	7.200	7.200	7.200
1992 OCT	6.800	6.900	7.200	7.200	7.200	7.200	7.200	7.200
1992 NOV	7.100	8.000	7.200	7.200	7.200	7.200	7.200	7.200
1992 DEC	7.000	8.600	7.200	7.200	7.200	7.200	7.200	7.200
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A		GUIDELINE = 15 (A3)			
1992 FEB	1.700	1.700	4.000	2.000	2.000	2.700	2.700	2.700
1992 MAR	1.800	1.800	2.000	2.000	2.000	2.700	2.700	2.700
1992 APR	2.500	2.000	7.000	7.000	7.000	14.000	14.000	14.000
1992 MAY	8.000	7.500	7.000	7.000	7.000	17.800	17.800	17.800
1992 JUN	15.000	14.500	7.000	7.000	7.000	19.600	19.600	19.600
1992 JUL	19.000	18.500	7.000	7.000	7.000	15.200	15.200	15.200
1992 AUG	20.800	20.600	18.000	18.000	18.000	11.500	11.500	11.500
1992 SEP	17.600	17.200	11.500	11.500	11.500	8.800	8.800	8.800
1992 OCT	14.800	14.200	8.800	8.800	8.800	8.800	8.800	8.800
1992 NOV	6.900	7.500	8.800	8.800	8.800	8.800	8.800	8.800
1992 DEC	3.200	4.600	8.800	8.800	8.800	8.800	8.800	8.800
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A		GUIDELINE = 1.0 (A1)			
1992 FEB	3.200	.330	3.200	3.200	3.200	3.200	3.200	3.200
1992 MAR	2.800	.680	3.200	3.200	3.200	3.200	3.200	3.200
1992 APR	3.300	.270	3.200	3.200	3.200	3.200	3.200	3.200
1992 MAY	1.500	.270	3.200	3.200	3.200	3.200	3.200	3.200
1992 JUN	1.300	1.100	3.200	3.200	3.200	3.200	3.200	3.200
1992 JUL	1.400	.430	3.200	3.200	3.200	3.200	3.200	3.200
1992 AUG	1.400	.900	3.200	3.200	3.200	3.200	3.200	3.200
1992 SEP	1.300	.210	3.200	3.200	3.200	3.200	3.200	3.200
1992 OCT	1.100	.270	3.200	3.200	3.200	3.200	3.200	3.200
1992 NOV	1.500	.150	3.200	3.200	3.200	3.200	3.200	3.200
1992 DEC	2.000	.350	3.200	3.200	3.200	3.200	3.200	3.200

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHEMISTRY (LABORATORY)					
ALKALINITY (MG/L)		DET'N LIMIT = 0.2		GUIDELINE = 30-500 (A4)	
1992 FEB	16.700	33.100	31.000	.	.
1992 MAR	16.100	29.200	31.800	33.200	.
1992 APR	19.000	29.800	.	29.300	30.300
1992 MAY	10.300	21.700	25.700	.	.
1992 JUN	10.800	34.100	.	31.200	31.900
1992 JUL	10.800	26.100	.	24.900	25.900
1992 AUG	14.700	31.600	.	31.000	31.300
1992 SEP	14.400	26.600	27.000	30.600	.
1992 OCT	15.300	16.400	27.900	28.200	21.500
1992 NOV	15.600	27.000	29.600	29.900	.
1992 DEC	14.100	28.000	.	.	.
CALCIUM (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 100 (F2)	
1992 FEB	6.600	15.100	14.800	.	.
1992 MAR	6.000	13.300	13.900	14.400	.
1992 APR	6.900	14.450	.	14.000	14.350
1992 MAY	4.600	9.900	11.000	.	.
1992 JUN	4.450	14.200	.	12.900	13.000
1992 JUL	4.600	13.100	.	12.800	12.900
1992 AUG	5.600	14.250	.	13.500	13.500
1992 SEP	5.850	13.350	13.700	14.800	.
1992 OCT	6.250	8.000	15.200	10.900	10.300
1992 NOV	6.200	14.450	14.750	.	.
1992 DEC	5.750	13.400	14.200	14.100	.
CYANIDE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 0.2 (A1)	
11 SAMPLES	.	BOL	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM		DIST. SYSTEM		DIST. SYSTEM ALFRED ST STANDING
		JOE ST FREE FLOW	JOE ST STANDING	ALFRED ST FREE FLOW	ALFRED ST STANDING	
CHEMISTRY (LABORATORY)						
CHLORIDE (MG/L)		DET'N LIMIT = 0.20		GUIDELINE = 250 (A3)		
1992 FEB	1,500	4,400	5,100			
1992 MAR	1,900	5,600	4,800	5,100	7,400	7,800
1992 APR	4,500	8,400				
1992 MAY	1,400	3,500	3,600	3,700		
1992 JUN	1,500	4,200			4,000	4,100
1992 JUL	1,500	5,200			4,000	4,200
1992 AUG	1,700	4,100			4,300	4,300
1992 SEP	2,000	4,600	4,800	4,800		4,800
1992 OCT	2,000	4,200				
1992 NOV	1,800	5,300	4,700	4,900		
1992 DEC	1,500	3,300	3,400	3,500		
COLOUR (HZU)						
		DET'N LIMIT = 0.50		GUIDELINE = 5 (A3)		
1992 FEB	37,000	4,000	4,000			
1992 MAR	37,500	3,500	6,000	6,000		
1992 APR	37,000	3,500			4,500	4,000
1992 MAY	37,500	3,000	4,500	5,000		
1992 JUN	37,500	5,000			5,000	5,000
1992 JUL	34,000	1,500			3,500	3,000
1992 AUG	35,000	5,500			5,500	5,500
1992 SEP	34,000	3,000	4,500	4,000		5,500
1992 OCT	38,000	5,500			6,000	
1992 NOV	41,500	3,500	5,500	5,500		
1992 DEC	36,000	4,500	6,000	5,000		
CONDUCTIVITY (UMHO/CM)						
		DET'N LIMIT = 1.0		GUIDELINE = 400 (F2)		
1992 FEB	63	137	136			
1992 MAR	64	135	137	140		
1992 APR	79	147			143	146
1992 MAY	47	112	119	119		
1992 JUN	51	137			127	130
1992 JUL	51	138			128	132
1992 AUG	60	133			131	132
1992 SEP	62	134	136	141		121
1992 OCT	64	111			124	
1992 NOV	62	137	136	138		
1992 DEC	58	123	125	126		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST		DIST. SYSTEM JOE ST		DIST. SYSTEM ALFRED ST		DIST. SYSTEM ALFRED ST	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
CHEMISTRY (LABORATORY)										
DISS ORG CARBON (MG/L)			DET'N LIMIT = 0.10		GUIDELINE = 5.0 (A3)					
1992 FEB	6.200	3.200	3.100		3.200					
1992 MAR	6.200	3.200	3.200	3.200			2.900		3.200	
1992 APR	6.300	3.000								
1992 MAY	6.500	2.800	2.800	2.800						
1992 JUN	6.600	3.400					3.700		3.400	
1992 JUL	6.000	2.700					2.400		2.500	
1992 AUG	6.700	3.300					3.500		3.300	
1992 SEP	6.800	3.100	3.000	2.900			3.400		4.500	
1992 OCT	6.900	3.400			3.000					
1992 NOV	6.800	3.100	3.000	2.900						
1992 DEC	6.400	3.100								
FLUORIDE (MG/L)			DET'N LIMIT = 0.01		GUIDELINE = 1.5 (A1)					
1992 FEB	.040 <T	.020 <T	.020 <T		.040 <T				.020 <T	
1992 MAR	.040 <T	.020 <T	.040 <T							
1992 APR	.060	.020 <T								
1992 MAY	.040 <T	.040 <T	.040 <T		.040 <T					
1992 JUN	.060	.040 <T					.060		.040 <T	
1992 JUL	.060	.020 <T					.020 <T		.020 <T	
1992 AUG	.040 <T	.040 <T								
1992 SEP	.040 <T	.020 <T	.020 <T		.020 <T				.040 <T	
1992 OCT	.020 <T	BOL					.040 <T		.040 <T	
1992 NOV	.020 <T	.020 <T	.040 <T		.020 <T					
1992 DEC	.060	.040 <T	.080		.060				BOL	
HARDNESS (MG/L)			DET'N LIMIT = 0.5		GUIDELINE = 80-100 (A4)					
1992 FEB	24.500	46.000	45.000		44.000					
1992 MAR	23.000	41.000	43.000				45.200		46.280	
1992 APR	27.010	46.710			34.200					
1992 MAY	16.700	30.700	33.200				38.000		39.000	
1992 JUN	17.000	42.000					38.000		38.000	
1992 JUL	17.000	39.000					40.590		40.410	
1992 AUG	20.680	42.420			43.850					
1992 SEP	21.840	40.680	41.260				35.000		34.000	
1992 OCT	23.000	27.000	45.210		44.100					
1992 NOV	22.870	43.750	42.440		42.300					
1992 DEC	21.310	40.650								

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM: 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST		DIST. SYSTEM JOE ST STANDING		DIST. SYSTEM ALFRED ST		DIST. SYSTEM ALFRED ST STANDING	
CHEMISTRY (LABORATORY)										
IONCAL (DMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = N/A					
1992 FEB	7.168	2.177	3.007		1.086					
1992 MAR	1.092	.309	.526							
1992 APR	1.697 NAF	1.718 NAF					.314 NAF		1.890 NAF	
1992 MAY	.521 NAF	3.103 NAF	4.827 NAF		3.909 NAF					
1992 JUN	.643	.295					1.141		3.516	
1992 JUL	.816	1.117					1.495		1.512	
1992 AUG	3.322 NAF	1.870 NAF					3.079 NAF		1.307 NAF	
1992 SEP	3.873	.423	.045		.956					2.505
1992 OCT	.457	4.257								
1992 NOV	1.159	.161	.406		.062					
1992 DEC	4.458	2.230	.437		1.466					
POTASSIUM (MG/L)										
			DET'N LIMIT = 0.01		GUIDELINE = 10 (F2)					
1992 FEB	.790	.760	.740		.730					
1992 MAR	.760	.730	.700				.907		.920	
1992 APR	.905	.948			.670					
1992 MAY	.630	.660	.660						.640	
1992 JUN	.640	.780					.660		.700	
1992 JUL	.670	.700					.700		.679	
1992 AUG	.687	.717					.678			
1992 SEP	.716	.704	.708		.727				.730	
1992 OCT	.680	.700					.680			
1992 NOV	.727	.717	.723		.718					
1992 DEC	.696	.662	.657		.682					
LANGELIERS INDEX (DMNSLESS)										
			DET'N LIMIT = N/A		GUIDELINE = N/A					
1992 FEB	-1.678	-.665	-.802							
1992 MAR	-1.716	-.844	-.739		-.706					
1992 APR	-1.580	-.855					-.894		-.860	
1992 MAY	-2.438	-1.461	-1.245		-1.198					
1992 JUN	-2.353	-.189					-.835		-.753	
1992 JUL	-2.339	-1.071					-1.117		-1.068	
1992 AUG	-2.034 NAF	-.449 NAF					-.880 NAF		-.856 NAF	
1992 SEP	-1.945	-1.103	-1.046		-.780					
1992 OCT	-1.941	-1.905					-1.447		-1.492	
1992 NOV	-1.975	-1.053	-.946		-1.026					
1992 DEC	-2.230	-.944	-.675		-.934					

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHEMISTRY (LABORATORY)					
MAGNESIUM (MG/L)		DET'N LIMIT = 0.1		GUIDELINE = 30.0 (F2)	
1992 FEB	1.940	1.980	1.910	.	.
1992 MAR	1.900	1.930	1.940	.	.
1992 APR	2.380	2.580	.	2.500	2.530
1992 MAY	1.260	1.450	1.460	.	.
1992 JUN	1.330	1.460	.	1.440	1.450
1992 JUL	1.410	1.440	.	1.400	1.410
1992 AUG	1.640	1.650	.	1.660	1.640
1992 SEP	1.750	1.790	1.670	.	.
1992 OCT	1.800	1.830	.	1.860	1.900
1992 NOV	1.790	1.850	1.760	.	.
1992 DEC	1.700	1.760	1.710	.	.
SODIUM (MG/L)					
		DET'N LIMIT = 0.20		GUIDELINE = 200 (A4)	
1992 FEB	2.270	8.240	8.360	.	.
1992 MAR	2.280	8.680	8.610	8.700	.
1992 APR	3.640	8.120	.	7.840	7.970
1992 MAY	1.640	9.090	9.490	.	.
1992 JUN	2.100	9.870	.	9.220	9.660
1992 JUL	1.850	9.740	.	.	9.060
1992 AUG	2.200	9.230	.	9.760	9.060
1992 SEP	2.340	9.100	9.000	9.000	.
1992 OCT	2.410	9.080	.	9.010	9.130
1992 NOV	2.180	8.320	7.970	.	.
1992 DEC	1.990	6.950	6.860	6.930	.
AMMONIUM TOTAL (MG/L)					
		DET'N LIMIT = 0.002		GUIDELINE = 0.05 (F2)	
1992 FEB	.060	.004 <T	.004 <T	.	.
1992 MAR	.062	BDL	.004 <T	.008 <T	.006 <T
1992 APR	.054	.010	.	.	.
1992 MAY	.034	.004 <T	.006 <T	.008 <T	.012
1992 JUN	.070	.018	.	.	.002 <T
1992 JUL	.050	.002 <T	.	.	.002 <T
1992 AUG	.074	.012	.	.	.
1992 SEP	.010	.008 <T	.008 <T	.008 <T	.004 <T
1992 OCT	.008 <T	.006 <T	.	.	.
1992 NOV	.010	.002 <T	.004 <T	.004 <T	.
1992 DEC	.054	.014	.010	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHEMISTRY (LABORATORY)					
NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.0 (A1)	
1992 FEB	.003 <T	BOL	.001 <T	.	.
1992 MAR	.004 <T	BOL	.001 <T	.003 <T	.005
1992 APR	.008	.004 <T	.	.002 <T	.005
1992 MAY	.004 <T	.002 <T	.	.003 <T	.002 <T
1992 JUN	.009	.016	.	.002 <T	.002 <T
1992 JUL	.004 <T	.001 <T	.	.001 <T	.
1992 AUG	.005	.006	.001 <T	.002 <T	.003 <T
1992 SEP	.005	.001 <T	.	.003 <T	.
1992 OCT	.006	.001 <T	.	.001 <T	.
1992 NOV	.005	.002 <T	.003 <T	.	.
1992 DEC	.006	.001 <T	.	.	.
NITRATE (TOTAL) (MG/L)		DET'N LIMIT = 0.005		GUIDELINE = 10.0 (A1)	
1992 FEB	.195	.200	.	.	.
1992 MAR	.205	.195	.200	.230	.235
1992 APR	.225	.	.	.	.
1992 MAY	.140	.150	.145	.190	.185
1992 JUN	.150	.	.	.190	.175
1992 JUL	.160	.	.	.210	.210
1992 AUG	.205	.310	.310	.395	.395
1992 SEP	.315	.	.	.	.
1992 OCT	.395	.295	.295	.	.
1992 NOV	.295	.205	.205	.	.
1992 DEC	.190	.	.	.	.
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = 0.02		GUIDELINE = N/A	
1992 FEB	.360	.160	.	.	.
1992 MAR	.360	.180	.220	.180	.200
1992 APR	.370	.190	.	.	.
1992 MAY	.360	.180	.180	.150	.150
1992 JUN	.320	.170	.	.130	.140
1992 JUL	.320	.	.	.180	.180
1992 AUG	.420	.180	.140	.190	.220
1992 SEP	.300	.130	.	.	.
1992 OCT	.360	.190	.170	.	.
1992 NOV	.320	.150	.180	.	.
1992 DEC	.350	.170	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHEMISTRY (LABORATORY)					
PH (DMNSLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
1992 FEB	7.620	8.010	7.910	.	.
1992 MAR	7.640	7.940	7.990	7.870	7.880
1992 APR	7.650	7.890	.	.	.
1992 MAY	7.220	7.570	7.670	7.700	.
1992 JUN	7.300	8.500	.	.	8.000
1992 JUL	7.300	7.770	.	.	7.780
1992 AUG	7.390	8.270	.	.	7.890
1992 SEP	7.470	7.720	7.760	7.940	.
1992 OCT	7.420	7.340	.	7.520	7.530
1992 NOV	7.380	7.730	7.800	7.730	.
1992 DEC	7.200	7.850	8.070	7.810	.
PHOSPHORUS FIL REACT (MG/L)					
		DET'N LIMIT = 0.0005		GUIDELINE = N/A	
1992 FEB	.003 <T	BDL	.	.	.
1992 MAR	.003 <T	BDL	.	.	.
1992 APR	.002 <T	BDL	.	.	.
1992 MAY	.001 <T	BDL	.	.	.
1992 JUN	BDL	BDL	.	.	.
1992 JUL	.001 <T	BDL	.	.	.
1992 AUG	.001 <T	BDL	.	.	.
1992 SEP	.001 <T	BDL	.	.	.
1992 OCT	.001 <T	BDL	.	.	.
1992 NOV	.001 <T	BDL	.	.	.
1992 DEC	.003 <T	BDL	.	.	.
PHOSPHORUS TOTAL (MG/L)					
		DET'N LIMIT = 0.002		GUIDELINE = 0.40 (F2)	
1992 FEB	.010	.002 <T	.	.	.
1992 MAR	.008 <T	BDL	.	.	.
1992 APR	.014	.002 <T	.	.	.
1992 MAY	.010	.003 <T	.	.	.
1992 JUN	.008 <T	BDL	.	.	.
1992 JUL	.010	.003 <T	.	.	.
1992 AUG	.018	BDL	.	.	.
1992 SEP	.006 <T	.006 <T	.	.	.
1992 OCT	.008 <T	.002 <T	.	.	.
1992 NOV	.013	.004 <T	.	.	.
1992 DEC	.012	.002 <T	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHEMISTRY (LABORATORY)					
RESIDUE FILTRATE (MG/L)		DET'N LIMIT = N/A	GUIDELINE = 500 (A3)		
1992 FEB	41.000 CRO	89.000 CRO			
1992 MAR	41.800 CRO	87.800 CRO	91.000 CRO		95.000 CRO
1992 APR	51.200 CRO	95.600 CRO		93.000 CRO	
1992 MAY	30.800 CRO	73.000 CRO	77.400 CRO		
1992 JUN	33.000 CRO	89.000 CRO		82.800 CRO	84.200 CRO
1992 JUL	33.400 CRO	89.800 CRO		83.000 CRO	85.800 CRO
1992 AUG	39.000 CRO	86.600 CRO		85.200 CRO	85.800 CRO
1992 SEP	40.400 CRO	87.200 CRO	91.600 CRO		
1992 OCT	41.800 CRO	72.200 CRO		80.400 CRO	78.600 CRO
1992 NOV	40.400 CRO	88.400 CRO	89.800 CRO		
1992 DEC	37.400 CRO	81.200 CRO	82.000 CRO		
SULPHATE (MG/L)					
		DET'N LIMIT = 0.20	GUIDELINE = 500 (A3)		
1992 FEB	8.690	22.390			
1992 MAR	8.750	22.360	22.440		22.880
1992 APR	9.140	23.200		22.170	
1992 MAY	8.160	24.720	24.550		
1992 JUN	8.280	22.490		22.470	23.080
1992 JUL	8.330	26.250		25.640	25.960
1992 AUG	7.650	23.070		20.490	22.750
1992 SEP	8.120	25.860	25.600		
1992 OCT	9.360	25.450		25.140	24.980
1992 NOV	8.670	25.990	25.590		
1992 DEC	8.380	23.570	22.550		
TURBIDITY (FTU)					
		DET'N LIMIT = 0.05	GUIDELINE = 1.0 (A1)		
1992 FEB	.760	.230 <T			
1992 MAR	3.200	.340	.590		.600
1992 APR	5.400	.490		.550	
1992 MAY	2.900	.470	.680		.470
1992 JUN	2.500	1.520 RRV		.540	.320
1992 JUL	2.100	.250		.200 <T	.570
1992 AUG	2.900	1.350 RRV		.480	
1992 SEP	2.200	.300	.550		.620
1992 OCT	2.000	.340		.360	
1992 NOV	3.400	.470	.530		
1992 DEC	3.700	.330	.430		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW		DIST. SYSTEM JOE ST STANDING		DIST. SYSTEM ALFRED ST FREE FLOW		DIST. SYSTEM ALFRED ST STANDING			
METALS												
SILVER (UG/L)		DET'N LIMIT = 0.05									GUIDELINE = N/A	
43 SAMPLES		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
ALUMINUM (UG/L)		DET'N LIMIT = 0.10									GUIDELINE = 100 (A4)	
1992 FEB	190.000	120.000	120.000	100.000	100.000	73.000	73.000	65.000	65.000	65.000		
1992 MAR	150.000	130.000	96.000	65.000	65.000	150.000	150.000	150.000	150.000	150.000		
1992 APR	200.000	79.000	54.000	54.000	54.000	98.000	98.000	98.000	98.000	98.000		
1992 MAY	99.000	79.000	54.000	54.000	54.000	93.000	93.000	93.000	93.000	93.000		
1992 JUN	140.000	110.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
1992 JUL	110.000	86.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
1992 AUG	130.000	78.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
1992 SEP	90.000	59.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
1992 OCT	110.000	210.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
1992 NOV	94.000	70.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
1992 DEC	150.000	97.000	54.000	54.000	54.000	48.000	48.000	48.000	48.000	48.000		
ARSENIC (UG/L)		DET'N LIMIT = 0.10									GUIDELINE = 25 (A1)	
1992 FEB	.950 <T	.160 <T	.220 <T	BDL	BDL	.420 <T	.420 <T	.200 <T	.200 <T	.200 <T		
1992 MAR	.590 <T	BDL	BDL	BDL	BDL	.280 <T	.280 <T	.240 <T	.240 <T	.240 <T		
1992 APR	.830 <T	.290 <T	.250 <T	.360 <T	.360 <T	.320 <T	.320 <T	.350 <T	.350 <T	.350 <T		
1992 MAY	.420 <T	.250 <T	.250 <T	.360 <T	.360 <T	.270 <T	.270 <T	.430 <T	.430 <T	.430 <T		
1992 JUN	.630 <T	.270 <T	.270 <T	.360 <T	.360 <T	.280 <T	.280 <T	.280 <T	.280 <T	.280 <T		
1992 JUL	.480 <T	BDL	.350 <T	.300 <T	.300 <T	.150 <T	.150 <T	.340 <T	.340 <T	.340 <T		
1992 AUG	.840 <T	.350 <T	.220 <T	.300 <T	.300 <T	.390 <T	.390 <T	.390 <T	.390 <T	.390 <T		
1992 SEP	.760 <T	.220 <T	.220 <T	.300 <T	.300 <T	.150 <T	.150 <T	.340 <T	.340 <T	.340 <T		
1992 OCT	1.000 <T	.220 <T	.220 <T	.300 <T	.300 <T	.150 <T	.150 <T	.340 <T	.340 <T	.340 <T		
1992 NOV	.910 <T	.140 <T	.150 <T	.280 <T	.280 <T	.390 <T	.390 <T	.390 <T	.390 <T	.390 <T		
1992 DEC	.850 <T	.360 <T	.390 <T	.340 <T	.340 <T	.390 <T	.390 <T	.390 <T	.390 <T	.390 <T		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
METALS					
BARIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 1000 (A2)	
1992 FEB	15.000	14.000	13.000	.	.
1992 MAR	17.000	16.000	14.000	16.000	17.000
1992 APR	16.000	15.000	.	.	.
1992 MAY	16.000	16.000	17.000	24.000	.
1992 JUN	16.000	13.000	.	.	11.000
1992 JUL	15.000	14.000	.	.	12.000
1992 AUG	16.000	13.000	.	.	11.000
1992 SEP	15.000	15.000	16.000	18.000	.
1992 OCT	15.000	17.000	14.000	19.000	23.000
1992 NOV	15.000	14.000	12.000	14.000	.
1992 DEC	15.000	13.000	.	.	.
BORON (UG/L)					
		DET'N LIMIT = 2.00		GUIDELINE = 5000 (A1)	
1992 FEB	3.000 <T	3.200 <T	3.300 <T	.	.
1992 MAR	4.200 <T	4.300 <T	4.300 <T	4.500 <T	3.700 <T
1992 APR	4.200 <T	3.900 <T	3.900 <T	4.400 <T	.
1992 MAY	3.900 <T	4.600 <T	.	.	4.500 <T
1992 JUN	5.400 <T	5.100 <T	5.000 <T	4.300 <T	4.700 <T
1992 JUL	5.100 <T	5.100 <T	4.800 <T	4.700 <T	4.400 <T
1992 AUG	4.600 <T	5.100 <T	5.100 <T	5.800 <T	4.900 <T
1992 SEP	6.600 <T	5.700 <T	5.000 <T	.	6.800 <T
1992 OCT	5.800 <T	5.100 <T	4.800 <T	4.600 <T	.
1992 NOV	5.000 <T	4.500 <T	.	.	.
1992 DEC	4.200 <T	.	.	.	.
BERYLLIUM (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 6800 (D4)	
1992 FEB	.060 <T	BDL	BDL	.	.
1992 MAR	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	.	.
1992 MAY	BDL	BDL	BDL	BDL	BDL
1992 JUN	BDL	BDL	BDL	BDL	BDL
1992 JUL	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 SEP	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	.060 <T	BDL	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
METALS					
CADMIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5.0 (A1)	
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 MAY	BDL	BDL	BDL	BDL	BDL
1992 JUN	BDL	BDL	BDL	BDL	BDL
1992 JUL	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 SEP	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL
COBALT (UG/L)		DET'N LIMIT = 0.02		GUIDELINE = N/A	
1992 FEB	.210 <T	.160 <T	.150 <T	.130 <T	.100 <T
1992 MAR	.180 <T	.160 <T	.130 <T	.110 <T	.110 <T
1992 APR	.180 <T	.120 <T	.130 <T	.1400	.140 <T
1992 MAY	.130 <T	.130 <T	.130 <T	.200 <T	.230 <T
1992 JUN	.120 <T	.090 <T	.180 <T	.110 <T	.120 <T
1992 JUL	.380 <T	.140 <T	.140 <T	.090 <T	.090 <T
1992 AUG	.140 <T	.130 <T	.130 <T	.150 <T	.150 <T
1992 SEP	.130 <T	.120 <T	.120 <T	.200 <T	.200 <T
1992 OCT	.140 <T	.140 <T	.140 <T	.120 <T	.120 <T
1992 NOV	.130 <T	.100 <T	.100 <T	.090 <T	.090 <T
1992 DEC	.180 <T	.100 <T	.120 <T	.090 <T	.090 <T
CHROMIUM (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 50.0 (A1)	
1992 FEB	.770 <T	BDL	BDL	BDL	BDL
1992 MAR	.680 <T	BDL	BDL	BDL	BDL
1992 APR	.700 <T	BDL	BDL	BDL	BDL
1992 MAY	BDL	BDL	BDL	BDL	BDL
1992 JUN	.560 <T	BDL	BDL	BDL	BDL
1992 JUL	.660 <T	BDL	BDL	BDL	BDL
1992 AUG	.570 <T	BDL	BDL	BDL	BDL
1992 SEP	.510 <T	BDL	BDL	BDL	BDL
1992 OCT	1.000 <T	.860 <T	.530 <T	1.700 <T	1.800 <T
1992 NOV	.920 <T	.730 <T	.730 <T	.550 <T	.550 <T
1992 DEC	.920 <T	.570 <T	.570 <T	.550 <T	.550 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST		DIST. SYSTEM JOE ST		DIST. SYSTEM ALFRED ST		DIST. SYSTEM ALFRED ST	
			FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING
METALS										
COPPER (UG/L)		DET'N LIMIT = 0.50			GUIDELINE = 1000 (A3)					
1992 FEB	2.100 <T	2.000 <T	30.000							
1992 MAR	3.200 <T	15.000	17.000		220.000					
1992 APR	1.500 <T	1.500 <T					2.800 <T		24.000	
1992 MAY	.910 <T	8.600	10.000		130.000					
1992 JUN	2.000 <T	1.500 <T								
1992 JUL	2.000 <T	2.900 <T					1.800 <T		11.000	
1992 AUG	1.700 <T	1.900 <T					3.600 <T		25.000	
1992 SEP	1.800 <T	4.300 <T	12.000		58.000		3.200 <T		23.000	
1992 OCT	2.400 <T	30.000					15.000		180.000	
1992 NOV	2.000 <T	2.900 <T	10.000		54.000					
1992 DEC	1.700 <T	2.100 <T	3.300 <T		34.000					
IRON (UG/L)		DET'N LIMIT = 6.00			GUIDELINE = 300 (A3)					
1992 FEB	230.000	15.000 <T	48.000 <T							
1992 MAR	210.000	23.000 <T	67.000		52.000 <T				19.000 <T	
1992 APR	230.000	8.500 <T					21.000 <T			
1992 MAY	150.000	8.300 <T	30.000 <T		63.000					
1992 JUN	150.000	16.000 <T								
1992 JUL	150.000	20.000 <T					31.000 <T		25.000 <T	
1992 AUG	150.000	11.000 <T					23.000 <T		31.000 <T	
1992 SEP	130.000	24.000 <T	62.000		35.000 <T		18.000 <T		30.000 <T	
1992 OCT	150.000	36.000 <T					43.000 <T		40.000 <T	
1992 NOV	180.000	9.900 <T	69.000		44.000 <T					
1992 DEC	210.000	11.000 <T	39.000 <T		23.000 <T					
MERCURY (UG/L)		DET'N LIMIT = 0.02			GUIDELINE = 1.0 (A1)					
22 SAMPLES		BDL	BDL							

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
METALS						
MANGANESE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 50.0 (A3)	
1992 FEB	8.900	5.100	4.700			
1992 MAR	11.000	10.000	6.500	6.700		
1992 APR	14.000	13.000			10.000	13.000
1992 MAY	13.000	8.400	9.300	17.000		
1992 JUN	16.000	7.300				
1992 JUL	14.000	6.300				
1992 AUG	18.000	5.400			5.400	5.500
1992 SEP	15.000	4.900	8.400	5.400	4.900	5.400
1992 OCT	17.000	83.000			3.500	4.100
1992 NOV	17.000	7.300	11.000	11.000		
1992 DEC	14.000	6.200	6.300	3.900	14.000	18.000
MOLYBDENUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = N/A	
1992 FEB	.200 <T	.210 <T	.170 <T	.180 <T	.250 <T	.260 <T
1992 MAR	.170 <T	.170 <T	.160 <T			
1992 APR	.250 <T	.260 <T				
1992 MAY	.130 <T	.120 <T	.120 <T	.090 <T		
1992 JUN	.130 <T	.100 <T			.140 <T	.110 <T
1992 JUL	.170 <T	.100 <T			.070 <T	BDL
1992 AUG	.130 <T	.160 <T			.170 <T	.140 <T
1992 SEP	.240 <T	.220 <T	.170 <T	.200 <T	.190 <T	.180 <T
1992 OCT	.250 <T	.230 <T		.230 <T		
1992 NOV	.230 <T	.210 <T	.240 <T	.220 <T		
1992 DEC	.210 <T	.180 <T	.230 <T			
NICKEL (UG/L)			DET'N LIMIT = 0.20		GUIDELINE = 350 (03)	
1992 FEB	1.400 <T	1.500 <T	1.300 <T	.960 <T		
1992 MAR	1.000 <T	1.000 <T	.890 <T			
1992 APR	1.000 <T	1.000 <T		.960 <T	.960 <T	.990 <T
1992 MAY	.280 <T	BDL	BDL	1.500 <T		
1992 JUN	.640 <T	.630 <T			.380 <T	.340 <T
1992 JUL	1.000 <T	1.400 <T			1.700 <T	1.800 <T
1992 AUG	.970 <T	.780 <T			.670 <T	.660 <T
1992 SEP	1.100 <T	18.000	1.200 <T	1.500 <T		
1992 OCT	.850 <T	1.000 <T			.860 <T	1.400 <T
1992 NOV	1.000 <T	.690 <T	.740 <T	.900 <T		
1992 DEC	1.500 <T	1.500 <T	1.700 <T	1.600 <T		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
METALS					
LEAD (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 10 (A1)	
1992 FEB	.160 <T	.150 <T			
1992 MAR	.250 <T	1.200	14.000		
1992 APR	.220 <T	.710		.230 <T	1.700
1992 MAY	.190 <T	BDL			
1992 JUN	.210 <T	.450 <T	10.000	.260 <T	2.300
1992 JUL	.170 <T			.200 <T	1.400
1992 AUG	.320 <T	.130 <T		.360 <T	4.900
1992 SEP	.140 <T	.820	4.900		
1992 OCT	.230 <T	.150 <T		.480 <T	4.100
1992 NOV	.190 <T	1.100	4.600		
1992 DEC		.340 <T	4.000		
ANTIMONY (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 146 (D4)	
1992 FEB	.530	.600			
1992 MAR	.400 <T	.500 <T	.490 <T		.460 <T
1992 APR	.380 <T			.530	
1992 MAY	.220 <T	.360 <T	1.900		
1992 JUN	.300 <T			.340 <T	.340 <T
1992 JUL	.520			.510	.680
1992 AUG	.360 <T			.420 <T	.460 <T
1992 SEP	.330 <T	4.200	9.600		
1992 OCT	.460 <T	.350 <T		.450 <T	.420 <T
1992 NOV	.470 <T	.500 <T	.570		
1992 DEC	.420 <T	.580	8.500		
SELENIUM (UG/L)					
		DET'N LIMIT = 1.00		GUIDELINE = 10 (A1)	
1992 FEB	BDL	BDL			
1992 MAR	BDL	BDL	BDL		BDL
1992 APR	BDL			BDL	
1992 MAY	BDL	BDL	BDL		BDL
1992 JUN	BDL			BDL	BDL
1992 JUL	BDL			BDL	BDL
1992 AUG	BDL	1.300 <T		BDL	1.400 <T
1992 SEP	BDL	BDL	BDL		BDL
1992 OCT	BDL			BDL	
1992 NOV	BDL	BDL	BDL		
1992 DEC	BDL	BDL	BDL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

METALS					
STRONTIUM (UG/L)					
TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
		DET'N LIMIT = 0.10			
		GUIDELINE = N/A			
1992 FEB	31.000	32.000	.	.	.
1992 MAR	32.000	38.000	41.000	.	.
1992 APR	32.000	.	.	36.000	36.000
1992 MAY	27.000	30.000	34.000	.	.
1992 JUN	28.000	.	.	31.000	31.000
1992 JUL	27.000	.	.	30.000	30.000
1992 AUG	30.000	.	.	32.000	33.000
1992 SEP	31.000	35.000	39.000	35.000	34.000
1992 OCT	30.000	35.000	39.000	.	.
1992 NOV	32.000	34.000	35.000	.	.
1992 DEC	29.000				
TITANIUM (UG/L)					
		DET'N LIMIT = 0.50			
		GUIDELINE = N/A			
1992 FEB	7.800	3.400 <T	4.700 <T	.	.
1992 MAR	7.300	4.900 <T	.	6.100	5.700
1992 APR	12.000	5.700	7.400	.	.
1992 MAY	7.100	5.800	.	7.000	6.500
1992 JUN	8.200	7.200	.	5.100	4.800 <T
1992 JUL	6.600	6.000	.	3.600 <T	4.000 <T
1992 AUG	6.500	4.100 <T	3.600 <T	1.900 <T	2.300 <T
1992 SEP	5.100	3.600 <T	.	.	.
1992 OCT	4.600 <T	3.000 <T	2.600 <T	.	.
1992 NOV	4.400 <T	2.400 <T	5.700	.	.
1992 DEC	9.200	5.500			
THALLIUM (UG/L)					
		DET'N LIMIT = 0.05			
		GUIDELINE = 13 (04)			
43 SAMPLES	BDL	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
METALS					
URANIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 100 (A1)	
1992 FEB	.080 <T	BDL			
1992 MAR	.080 <T	BDL	.070 <T		
1992 APR	BDL	BDL		BDL	BDL
1992 MAY	BDL	BDL			
1992 JUN	BDL			BDL	BDL
1992 JUL	.060 <T			BDL	.060 <T
1992 AUG	BDL	.070 <T		BDL	.060 <T
1992 SEP	BDL	BDL			
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 NOV	.060 <T	BDL			
1992 DEC	BDL	BDL			
VANADIUM (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = N/A	
1992 FEB	.430 <T	.090 <T			
1992 MAR	.300 <T	BDL	.090 <T		
1992 APR	.340 <T	BDL		BDL	BDL
1992 MAY	.230 <T	.080 <T	.130 <T		
1992 JUN	.190 <T	.120 <T		.140 <T	.150 <T
1992 JUL	.260 <T	.070 <T		.090 <T	BDL
1992 AUG	.330 <T	.130 <T		.070 <T	.140 <T
1992 SEP	.120 <T	BDL	BDL		
1992 OCT	.340 <T	.130 <T		BDL	BDL
1992 NOV	.140 <T	BDL	BDL		
1992 DEC	.330 <T	BDL	.140 <T		
ZINC (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 5000 (A3)	
1992 FEB	5.700	3.900			
1992 MAR	3.800	11.000	6.600		
1992 APR	4.600	4.400	3.300	32.000	
1992 MAY	6.400	14.000	5.900		8.600
1992 JUN	5.400	3.900		35.000	
1992 JUL	5.300	6.100			6.500
1992 AUG	3.900	2.900			6.800
1992 SEP	4.300	4.600	5.600		7.900
1992 OCT	4.200	12.000		17.000	
1992 NOV	2.900	2.900	4.400	15.000	16.000
1992 DEC	4.600	4.900	5.000	9.500	

DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TABLE 4

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHLOROAROMATICS					
HEXACHLOROBUTADIENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = 450 (D4)	
33 SAMPLES	BDL	BDL		BDL	
123-TRICHLOROBENZENE (NG/L)		DET/N LIMIT = 5.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
1234-TETCHLOROBENZENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
1235-TETCHLOROBENZENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
124-TRICHLOROBENZENE (NG/L)		DET/N LIMIT = 5.000		GUIDELINE = 10000 (I)	
30 SAMPLES	BDL	BDL		BDL	
1245-TETCHLOROBENZENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = 38000 (D4)	
33 SAMPLES	BDL	BDL		BDL	
135-TRICHLOROBENZENE (NG/L)		DET/N LIMIT = 5.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
HEXACHLOROBENZENE (NG/L)		DET/N LIMIT = 1.000		GUIDELINE = 10 (C1)	
33 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHLOROAROMATICS					
HEXACHLOROETHANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 1900 (D4)	
1992 FEB	BDL	5.000 <T	6.000 <T	.	.
1992 MAR	BDL	6.000 <T	BDL	.	.
1992 APR	BDL	2.000 <T	.	1.000 <T	.
1992 MAY	BDL	1.000 <T	1.000 <T	.	.
1992 JUN	BDL	2.000 <T	.	BDL	.
1992 JUL	BDL	3.000 <T	.	1.000 <T	.
1992 AUG	BDL	BDL	.	BDL	.
1992 SEP	BDL	1.000 <T	BDL	.	.
1992 OCT	BDL	BDL	1.000 <T	BDL	.
1992 NOV	BDL	3.000 <T	.	.	.
1992 DEC	BDL	2.000 <T	BDL	.	.
OCTACHLOROSTYRENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL	BDL	.	BDL
PENTACHLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 74000 (D4)	
33 SAMPLES	BDL	BDL	BDL	.	BDL
236-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL	BDL	.	BDL
245-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL	BDL	.	BDL
26A-TRICHLOROTOLUENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL	BDL	.	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
CHLOROPHENOLS					
234-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A	
22 SAMPLES	BDL	BDL			
2345-TETACHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
22 SAMPLES	BDL				
2356-TETACHLOROPHENOL (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
22 SAMPLES	BDL				
245-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 2600000 (D4)	
22 SAMPLES	BDL				
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 5000 (A1)	
1992 FEB	BDL	110.000 <T			
1992 MAR	BDL	BDL			
1992 APR	BDL	BDL			
1992 MAY	BDL	60.000 <T			
1992 JUN	BDL	70.000 <T			
1992 JUL	BDL	50.000 <T			
1992 AUG	BDL	40.000 <T			
1992 SEP	BDL	250.000			
1992 OCT	20.000 <T	110.000 <T			
1992 NOV	BDL	240.000			
1992 DEC	BDL	40.000 <T			
PENTACHLOROPHENOL (NG/L)		DET'N LIMIT = 10.00		GUIDELINE = 60000 (A1)	
1992 FEB	BDL	BDL			
1992 MAR	BDL	BDL			
1992 APR	BDL	80.000 <T			
1992 MAY	BDL	50.000 <T			
1992 JUN	BDL	BDL			
1992 JUL	BDL	BDL			
1992 AUG	BDL	BDL			
1992 SEP	BDL	BDL			
1992 OCT	BDL	BDL			
1992 NOV	BDL	BDL			
1992 DEC	BDL	BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
PESTICIDES AND PCB					
ALDRIN (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700 (A1)	
33 SAMPLES	BDL	BDL		BDL	
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700 (G)	
1992 FEB	BDL	BDL			
1992 MAR	BDL	BDL			
1992 APR	BDL			BDL	
1992 MAY	BDL	BDL			
1992 JUN	BDL			BDL	
1992 JUL	BDL			BDL	
1992 AUG	BDL			BDL	
1992 SEP	1.000 <T	1.000 <T			
1992 OCT	BDL			BDL	
1992 NOV	BDL	BDL			
1992 DEC	BDL	BDL			
BETA BHC (NG/L)		DET'N LIMIT = 1.00		GUIDELINE = 300 (G)	
33 SAMPLES	BDL	BDL		BDL	
LINDANE (GAMMA BHC) (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 4000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
ALPHA CHLORDANE (NG/L)		DET'N LIMIT = 2.000		GUIDELINE = 7000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
GAMMA CHLORDANE (NG/L)		DET'N LIMIT = 2.00		GUIDELINE = 7000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
DIELDRIN (NG/L)		DET'N LIMIT = 2.00		GUIDELINE = 700 (A1)	
33 SAMPLES	BDL	BDL		BDL	
METHOXYCHLOR (NG/L)		DET'N LIMIT = 5.0		GUIDELINE = 900000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
ENDOSULFAN 1 (NG/L)		DET'N LIMIT = 2.00		GUIDELINE = 74000 (D4)	
33 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
PESTICIDES AND PCB					
ENDOSULFAN II (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 74000 (D4)	
33 SAMPLES	BDL	BDL		BDL	
ENDRIN (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 1600 (D3)	
33 SAMPLES	BDL	BDL		BDL	
ENDOSULFAN SULPHATE (NG/L)		DET'N LIMIT = 5.00		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
HEPTACHLOR EPOXIDE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 3000 (A1)	
24 SAMPLES	BDL	BDL		BDL	
HEPTACHLOR (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 3000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
MIREX (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
OXYCHLORDANE (NG/L)		DET'N LIMIT = 2.000		GUIDELINE = N/A	
33 SAMPLES	BDL	BDL		BDL	
O,P-DDT (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 30000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
PCB (NG/L)		DET'N LIMIT = 20.00		GUIDELINE = 3000 (A2)	
33 SAMPLES	BDL	BDL		BDL	
P,P-DDD (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 30000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
P,P-DDE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 30000 (A1)	
33 SAMPLES	BDL	BDL		BDL	
P,P-DDT (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 30000 (A1)	
33 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
PESTICIDES AND PCB					
TOXAPHENE (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 5000 (A1)	
33 SAMPLES	BDL	BDL			BDL
AMETRINE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 300000 (D3)	
22 SAMPLES	BDL				
ATRAZINE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 60000 (A2)	
22 SAMPLES	BDL				
ATRATONE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = N/A	
20 SAMPLES	BDL				
CYANAZINE (BLADEX) (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 10000 (A2)	
22 SAMPLES	BDL				
DESETHYL ATRAZINE (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = 60000 (A2)	
22 SAMPLES	BDL				
DESETHYL SIMAZINE (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = 10000 (A2)	
20 SAMPLES	BDL				
PROMETONE (NG/L)		DET'N LIMIT = 50.000		GUIDELINE = 52500 (D3)	
22 SAMPLES	BDL				
PROPABINE (NG/L)		DET'N LIMIT = 50.000		GUIDELINE = 700000 (D3)	
22 SAMPLES	BDL				
PROMETRYNE (NG/L)		DET'N LIMIT = 50.000		GUIDELINE = 1000 (A2)	
22 SAMPLES	BDL				
METRIBUZIN (SENCOR) (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 80000 (A1)	
20 SAMPLES	BDL				
SIMAZINE (NG/L)		DET'N LIMIT = 50.00		GUIDELINE = 10000 (A2)	
22 SAMPLES	BDL				

TABLE 4

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM		DIST. SYSTEM		DIST. SYSTEM ALFRED ST STANDING
		JOE ST FREE FLOW	JOE ST STANDING	ALFRED ST FREE FLOW	ALFRED ST STANDING	
PESTICIDES AND PCB						
ALACHLOR (LASSO) (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 5000 (A2)		
22 SAMPLES	BDL					
METOLACHLOR (NG/L)		DET'N LIMIT = 500.0		GUIDELINE = 50000 (A2)		
22 SAMPLES	BDL					
HEXACYCLOPENTA01EN (NG/L)		DET'N LIMIT = 5.00		GUIDELINE = 206000 (D4)		
2 SAMPLES	BDL	1QU		BDL		1QU

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
PHENOLICS					
PHENOLICS (UG/L)		DET'N LIMIT = 0.2		GUIDELINE = N/A	
1992 FEB	.400 <T				
1992 MAR	BDL				
1992 APR	.600 <T				
1992 MAY	1.000				
1992 JUN	BDL				
1992 JUL	.600 <T				
1992 AUG	BDL				
1992 SEP	.600 <T				
1992 OCT	.600 <T				
1992 NOV	.600 <T				
1992 DEC	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
POLYAROMATIC HYDROCARBONS					
PHENANTHRENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
ANTHRACENE (NG/L)		DET'N LIMIT = 1.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
FLUORANTHENE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 42000 (D4)	
1 SAMPLES		BDL			
PYRENE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
BENZO(A)ANTHRACENE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
CHRYSENE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
DIMETH. BENZ(A)ANTHR (NG/L)		DET'N LIMIT = 5.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
BENZO(E) PYRENE (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
BENZO(B) FLUORANTHEN (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
PERYLENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
BENZO(K) FLUORANTHEN (NG/L)		DET'N LIMIT = 1.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
BENZO(A) PYRENE (NG/L)		DET'N LIMIT = 5.0		GUIDELINE = 10 (A1)	
1 SAMPLES		BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
POLYAROMATIC HYDROCARBONS					
BENZO(G,H,I) PERYLEN (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
DIBENZO(A,H) ANTHRAC (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
INDENO(1,2,3-C,D) PY (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
BENZO(B) CHRYSENE (NG/L)		DET'N LIMIT = 2.0		GUIDELINE = N/A	
1 SAMPLES		BDL			
CORONENE (NG/L)		DET'N LIMIT = 10.0		GUIDELINE = N/A	
1 SAMPLES		BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
SPECIFIC PESTICIDES					
2,4,5-T (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 280000 (A1)	
22 SAMPLES	BDL				
2,4-D (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = 100000 (A1)	
22 SAMPLES	BDL				
2,4-DB (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = N/A	
22 SAMPLES	BDL				
2,4 D PROPTIONIC ACID (NG/L)		DET'N LIMIT = 100.0		GUIDELINE = N/A	
22 SAMPLES	BDL				
DICAMBA (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 120000 (A1)	
22 SAMPLES	BDL				
2,4,5-TP (SILVEX) (NG/L)		DET'N LIMIT = 20.00		GUIDELINE = 10000 (A1)	
22 SAMPLES	BDL				
DIAZINON (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 20000 (A1)	
4 SAMPLES	BDL				
DICHLOROVOS (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
CHLORPYRIFOS (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
ETHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 35000 (G)	
4 SAMPLES	BDL				
MALATHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 190000 (A1)	
4 SAMPLES	BDL				
MEVINPHOS (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
4 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
SPECIFIC PESTICIDES					
METHYL PARATHION (NG/L)		DET'N LIMIT = 50.0		GUIDELINE = 9000 (D3)	
4 SAMPLES	BDL				
METHYLTRITHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
PARATHION (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 50000 (A1)	
4 SAMPLES	BDL				
PHORATE (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = 2000 (A2)	
4 SAMPLES	BDL				
RELDAN (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
RONNEL (NG/L)		DET'N LIMIT = 20.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
CARBOFURAN (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 90000 (A1)	
4 SAMPLES	BDL				
CHLOROPHOS (CIPC) (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 350000 (G)	
4 SAMPLES	BDL				
DIALLATE (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
EPTAM (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
IPC (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = N/A	
4 SAMPLES	BDL				
PROPOXUR (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 140000 (D3)	
4 SAMPLES	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM		DIST. SYSTEM		DIST. SYSTEM	
		JOE ST FREE FLOW	JOE ST STANDING	ALFRED ST FREE FLOW	ALFRED ST STANDING	ALFRED ST FREE FLOW	ALFRED ST STANDING
SPECIFIC PESTICIDES							
CARBARYL (NG/L)		DET'N LIMIT = 200.0		GUIDELINE = 90000 (A1)			
4 SAMPLES	BDL		BDL				
BUTYLATE (NG/L)		DET'N LIMIT = 2000.0		GUIDELINE = 245000 (D3)			
4 SAMPLES	BDL		BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
VOLATILES					
BENZENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)	
32 SAMPLES	BDL	BDL	BDL	BDL	BDL
TOLUENE (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 24 (A3)	
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 MAY	BDL	BDL	BDL	BDL	BDL
1992 JUN	BDL	BDL	BDL	BDL	BDL
1992 JUL	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 SEP	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL
ETHYLBENZENE (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 2.4 (A3)	
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 MAY	BDL	BDL	BDL	BDL	BDL
1992 JUN	BDL	BDL	BDL	BDL	BDL
1992 JUL	BDL	BDL	BDL	BDL	BDL
1992 AUG	BDL	BDL	BDL	BDL	BDL
1992 SEP	BDL	BDL	BDL	BDL	BDL
1992 OCT	BDL	BDL	BDL	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL
P-XYLENE (UG/L)					
		DET'N LIMIT = 0.10		GUIDELINE = 300 (A3*)	
32 SAMPLES	BDL	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
VOLATILES					
M-XYLENE (UG/L)		DET/N LIMIT = 0.10		GUIDELINE = 300 (A3*)	
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 MAY	.100 <T	.200 <T	.200 <T	.100 <T	.100 <T
1992 JUN	BDL	.100 <T	.100 <T	BDL	BDL
1992 JUL	BDL	BDL	BDL	.200 <T	.200 <T
1992 AUG	BDL	.400 <T	.400 <T	BDL	BDL
1992 SEP	BDL	.100 <T	.100 <T	BDL	BDL
1992 OCT	BDL	.100 <T	.100 <T	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL
O-XYLENE (UG/L)		DET/N LIMIT = 0.05		GUIDELINE = 300 (A3*)	
1992 FEB	BDL	BDL	BDL	BDL	BDL
1992 MAR	BDL	BDL	BDL	BDL	BDL
1992 APR	BDL	BDL	BDL	BDL	BDL
1992 MAY	.050 <T	.050 <T	.050 <T	.050 <T	.050 <T
1992 JUN	BDL	.050 <T	.050 <T	BDL	BDL
1992 JUL	BDL	BDL	BDL	.050 <T	.050 <T
1992 AUG	BDL	.150 <T	.150 <T	BDL	BDL
1992 SEP	BDL	.050 <T	.050 <T	BDL	BDL
1992 OCT	BDL	.050 <T	.050 <T	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	BDL	BDL	BDL	BDL	BDL
STYRENE (UG/L)		DET/N LIMIT = 0.05		GUIDELINE = 100 (D1)	
1992 FEB	.050 <T	BDL	BDL	BDL	BDL
1992 MAR	.050 <T	IUI	.050 <T	.200 <T	.200 <T
1992 APR	.200 <T	.150 <T	.150 <T	.300 <T	.300 <T
1992 MAY	.150 <T	.150 <T	.150 <T	.200 <T	.200 <T
1992 JUN	.150 <T	.200 <T	.200 <T	.200 <T	.200 <T
1992 JUL	BDL	.200 <T	.200 <T	BDL	BDL
1992 AUG	BDL	.200 <T	.200 <T	BDL	BDL
1992 SEP	BDL	.100 <T	.100 <T	BDL	BDL
1992 OCT	BDL	.100 <T	.100 <T	BDL	BDL
1992 NOV	BDL	BDL	BDL	BDL	BDL
1992 DEC	.100 <T	.150 <T	.100 <T	BDL	BDL
1,1-DICHLOROETHYLENE (UG/L)		DET/N LIMIT = 0.100		GUIDELINE = 7 (D1)	
32 SAMPLES	BDL	BDL	BDL	BDL	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
VOLATILES					
METHYLENE CHLORIDE (UG/L)		DET'N LIMIT = 0.50		GUIDELINE = 50 (A1)	
32 SAMPLES	BDL	BDL		BDL	
T12-DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 70 (D1)	
32 SAMPLES	BDL	BDL		BDL	
1,1-DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = N/A	
32 SAMPLES	BDL	BDL		BDL	
CHLOROFORM (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)	
1992 FEB	.900 <T	87.900	91.200		
1992 MAR	.700 <T	77.100			
1992 APR	1.300	83.700		64.400	
1992 MAY	.400 <T	70.700			
1992 JUN	1.400	83.700		71.800	
1992 JUL	.300 <T	144.000		90.000	
1992 AUG	.400 <T	69.100		67.000	
1992 SEP	.400 <T	89.200	77.900		
1992 OCT	1.000	67.300		68.200	
1992 NOV	.200 <T	139.700	93.600		
1992 DEC	.300 <T	46.200	46.400		
111, TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.02		GUIDELINE = 200 (D1)	
32 SAMPLES	BDL	BDL		BDL	
1,2 DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)	
32 SAMPLES	BDL	BDL		BDL	
CARBON TETRACHLORIDE (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 5 (A1)	
32 SAMPLES	BDL	BDL		BDL	
1,2-DICHLOROPROPANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 5 (D1)	
32 SAMPLES	BDL	BDL		BDL	
TRICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 50 (A1)	
32 SAMPLES	BDL	BDL		BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
VOLATILES					
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 350 (A1+)	
1992 FEB	BDL	3.350	3.150	.	.
1992 MAR	BDL	IUI	2.400	.	.
1992 APR	BDL	4.450	.	2.950	.
1992 MAY	BDL	2.800	2.200	.	.
1992 JUN	BDL	3.200	.	3.200	.
1992 JUL	BDL	6.350	.	4.350	.
1992 AUG	BDL	2.700	.	3.100	.
1992 SEP	BDL	4.100	3.800	.	.
1992 OCT	BDL	3.350	.	2.950	.
1992 NOV	BDL	6.650	4.700	.	.
1992 DEC	BDL	2.950	2.650	.	.
112-TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 0.6 (D4)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
CHLOROIBROMOMETHANE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 350 (A1+)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
TETRACHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 65 (A5)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
BROMOFORM (UG/L)		DET'N LIMIT = 0.20		GUIDELINE = 350 (A1+)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
1122-TETACHLOROETHANE (UG/L)		DET'N LIMIT = 0.05		GUIDELINE = 0.17 (D4)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
VINYL CHLORIDE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 2 (D1)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
C12-DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 70 (D1)	
32 SAMPLES	BDL	BDL	BDL	.	BDL
CHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10		GUIDELINE = 1510 (D3)	
32 SAMPLES	BDL	BDL	BDL	.	BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
VOLATILES					
1,4-DICHLOROBENZENE (UG/L)					
		DET'N LIMIT = 0.10		GUIDELINE = 5 (A1)	
1992 FEB	BDL	BDL			
1992 MAR	.100 <T	IUI			
1992 APR	BDL	BDL		BDL	
1992 MAY	BDL	BDL			
1992 JUN	BDL	BDL		BDL	
1992 JUL	BDL	.400 <T		BDL	
1992 AUG	BDL	BDL		BDL	
1992 SEP	BDL	.400 <T			
1992 OCT	BDL	BDL		BDL	
1992 NOV	BDL	BDL			
1992 DEC	.100 <T	BDL			
1,3-DICHLOROBENZENE (UG/L)					
		DET'N LIMIT = 0.10		GUIDELINE = 3750 (D3)	
32 SAMPLES	BDL	BDL		BDL	
1,2-DICHLOROBENZENE (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 200 (A1)	
32 SAMPLES	BDL	BDL		BDL	
ETHYLENE DIBROMIDE (UG/L)					
		DET'N LIMIT = 0.05		GUIDELINE = 50 (D1)	
32 SAMPLES	BDL	BDL		BDL	
TOL TRIHALOMETHANES (UG/L)					
		DET'N LIMIT = 0.50		GUIDELINE = 350 (A1)	
1992 FEB	.900 <T	91.250			
1992 MAR	.700 <T	IUI			
1992 APR	1.300 <T	88.150		67.350	
1992 MAY	BDL	73.500			
1992 JUN	1.400 <T	86.900		75.000	
1992 JUL	BDL	150.250		94.350	
1992 AUG	BDL	71.800		70.100	
1992 SEP	BDL	93.300			
1992 OCT	1.000 <T	70.650		71.150	
1992 NOV	BDL	146.350			
1992 DEC	BDL	49.150			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1992 PEMBROKE WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	DIST. SYSTEM JOE ST FREE FLOW	DIST. SYSTEM JOE ST STANDING	DIST. SYSTEM ALFRED ST FREE FLOW	DIST. SYSTEM ALFRED ST STANDING
RADIONUCLIDES					
COBALT 60 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = N/A	
4 SAMPLES	BDL				
CESIUM 134 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = N/A	
4 SAMPLES	BDL				
CESIUM 137 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = 50 (A1)	
4 SAMPLES	BDL				
GROSS ALPHA COUNT (BQ/L)		DET'N LIMIT = 0.04		GUIDELINE = 0.55 (D1)	
4 SAMPLES	BDL				
GROSS BETA COUNT (BQ/L)		DET'N LIMIT = 0.04		GUIDELINE = N/A	
1992 MAR	.050				
1992 SEP	.060				
TRITIUM (BQ/L)		DET'N LIMIT = 7.00		GUIDELINE = 40000 (A1)	
1992 MAR	BDL				
1992 SEP	13.000				
IODINE 131 (BQ/L)		DET'N LIMIT = 0.70		GUIDELINE = 10 (A1)	
4 SAMPLES	BDL				

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.20	30-500 (A4)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.20	100.0 (F2)
CHLORIDE	MG/L	0.20	250.0 (A3)
COLOUR	TCU	0.50	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.00	400.0 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.10	5.0 (A3)
FLUORIDE	MG/L	0.01	1.5* (A1)
HARDNESS	MG/L	0.50	80-100 (A4)
IONCAL	DMNSLESS	N/A	N/A
LANGELIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.10	30.0 (F2)
NITRATES (TOTAL)	MG/L	0.005	10.0 (A1)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
POTASSIUM	MG/L	0.010	10.0 (F2)
RESIDUE FILTRATE (CALCULATED TDS)	MG/L	N/A	500.0 (A3)
SODIUM	MG/L	0.20	200.0 (A4)
SULPHATE	MG/L	0.20	500.0 (A4)
TURBIDITY	FTU	0.05	1.0 (A1)

* The Maximum Acceptable Concentration (MAC) for naturally occurring fluoride in drinking water is 2.4 mg/L.

CHLOROAROMATICS

1,2,3-TRICHLOROBENZENE	NG/L	5.0	N/A
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,4-TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.0	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.0	N/A
2,3,6-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,6A-TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE (HCB)	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)

CHLOROPHENOLS

2,3,4-TRICHLOROPHENOL	NG/L	100.0	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	20.0	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
2,4,5-TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	N/A
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
POLYNUCLEAR AROMATIC HYDROCARBONS			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000 (D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRATONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DESETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADAX)	NG/L	100.0	10000 (A2)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	30000 (A1)
O,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDE	NG/L	1.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPAZINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
DESETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	N/A
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.0	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.0	280000 (A1)
2,4-DICHLOROBTYRIC ACID (2,4-D)	NG/L	100.0	100000 (A1)
2,4-DICHLOROPHENOXYBUTYRIC ACID (2,4-DB)	NG/L	200.0	N/A
2,4,5-TP (SILVEX)	NG/L	20.0	10000 (A1)
BUTYLATE (SUTAN)	NG/L	2000.0	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.0	90000 (A1)
CARBOFURAN	NG/L	2000.0	90000 (A1)
CHLORPROPHAM (CIPC)	NG/L	2000.0	350000 (G)
CHLORPYRIFOS (DURSBN)	NG/L	20.0	N/A
DIALATE	NG/L	2000.0	N/A
DIAZINON	NG/L	20.0	20000 (A1)
DICAMBA	NG/L	50.0	120000 (A1)
DICHLOROVOS	NG/L	20.0	N/A
EPTAM	NG/L	2000.0	N/A
ETHION	NG/L	20.0	35000 (G)
IPC	NG/L	2000.0	N/A
MALATHION	NG/L	20.0	190000 (A1)
METHYL PARATHION	NG/L	50.0	9000 (D3)
METHYLTRITHION	NG/L	20.0	N/A
MEVINPHOS	NG/L	20.0	N/A
PARATHION	NG/L	20.0	50000 (A1)
PHORATE (THIMET)	NG/L	20.0	2000 (A2)
PICHLORAM	NG/L	100.0	190000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.0	140000 (D3)
RELDAN	NG/L	20.0	N/A
RONNEL	NG/L	20.0	N/A
VOLATILES			
1,1-DICHLOROETHANE	UG/L	0.10	N/A
1,1-DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2-DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2-DICHLOROETHANE	UG/L	0.05	5 (A1)
1,2-DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3-DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4-DICHLOROBENZENE	UG/L	0.10	5 (A1)
1,1,1-TRICHLOROETHANE	UG/L	0.02	200 (D1)
1,1,2-TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1,1,2,2-TETRACHLOROETHANE	UG/L	0.05	0.17 (D4)

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
CIS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHYLENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	65 (A5)
TRANS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)
VINYL CHLORIDE	UG/L	0.10	2 (D1)
RADIONUCLIDES			
TRITIUM	BQ/L	7.0	40000 (A1)
GROSS ALPHA COUNT	BQ/L	0.04	0.55# (D1)
GROSS BETA COUNT	BQ/L	0.04	N/A
COBALT 60	BQ/L	0.70	N/A
CESIUM 134	BQ/L	0.70	N/A
CESIUM 137	BQ/L	0.70	50 (A1)
IODINE 131	BQ/L	0.70	10 (A1)

Equal to 15.0 Picocuries/litre

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1992, 109 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment and Energy (MOEE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOEE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOEE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY

All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS

Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME

Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOEE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOEE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOEE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOEE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

PARAMETER REFERENCE INFORMATION

NAME: BENZENE

CAS#: 71-43-2

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 $\mu g/L$

SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27)
CYCLOHEXATRIENE (41)

CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NONPOLAR LIQUID, OF
HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN
WITH SMOKING FLAME (30)

PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41)
THRESHOLD ODOUR: 0.5 - 10 PPM IN WATER
THRESHOLD TASTE: 0.5 mg/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS
AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT
A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES,
SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM
SOILS OR ARE DEGRADED RATHER QUICKLY (80)

SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR
DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES;
COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER
COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND
RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING
AGENT; GASOLINE.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING
BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION
WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION,
COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION,
OXIDATION

ADDITIONAL PROPERTIES: MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27)
BOILING POINT: 80.1°C (27)
SPECIFIC GRAVITY: 0.8790 AT 20°C (27)
VAPOUR PRESSURE: 100 MM AT 26.1°C (27)
HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41)
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39)
CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41)
SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle -fill bottle completely without bubbles
Organics (OWOC), (OWTRI)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Specific Pesticides (OWCP), (PEOP), (PECAR)	-as per Organics -three extra bottles must be filled
Polyaromatic hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate
Cyanide (Treated only)	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (Caution: NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) - and potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) (Caution: HNO_3 & $\text{K}_2\text{Cr}_2\text{O}_7$ are corrosive)

Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year) (PBVOL), (PBEXT)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

Steps:

1. Let sampling water tap run for an adequate time to clear the sample line.
2. Record time of day on submission sheet.
3. Record temperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.
6. No smoking in area of sample location.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.

5. Fill general chemistry and metals bottles.

6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (Caution: HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Polyaromatic Hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate

Steps:

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

